Polygon Sum Conjecture 02/15/18

IWBAT discover the sum of the angle measures in a polygon, practice construction skills, and develop reasoning and problem-solving skills.

Polygon Sum Conjecture

Polygon a plane figure with at least three straight sides and angles, and typically five or more.

Each partnership will draw several examples of their polygon. They will then measure the interior angles of their polygon and sum the measures. The partnership will come up with a conjecture for their particular polygon.

- Quadrilateral
- Pentagon
- Hexagon
- Heptagon
- Octagon
- Nonagon
- Decagon
- Hendecagon
- Dodecagon

The sum of the ____ angles of any ___________ is _____.

IWBAT discover the sum of the angle measures in a polygon, practice construction skills, and develop reasoning and problem-solving skills.

Polygon Sum Conjecture

The sum of the ____ angles of any __________ is _____.

$\triangle$ 3, 1×180, 180°

Polygon	n, sum	
Quadrilateral	4, 360°	2×180
Pentagon	5, 540°	3×180
Hexagon	6, 720°	$4\times$
Heptagon	7, 900°	$5\times$
Octagon	8, 1080°	$6\times$
Nonagon	9, 1260°	
Decagon	10, 1440°	
Hendecagon	11, 1620°	
Dodecagon	12, 1800°	

>180

$(n-2)(180) =$

n = number of sides

Cuantos lados

$(12-2)(180) =$

$10 \cdot 180 = 1800^\circ$

IWBAT discover the sum of the angle measures in a polygon, practice construction skills, and develop reasoning and problem-solving skills.

Polygon Sum Conjecture

Polygon sum conjecture

The sum of the n interior angles of an n-gon is $(n-2)(180^\circ)$.

Exercises DG pp. 257-8 #1, 2, 5, 6, 8-11

IWBAT discover the sum of the angle measures in a polygon, practice construction skills, and develop reasoning and problem-solving skills.

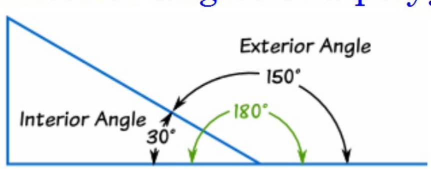
Exterior angles of a polygon

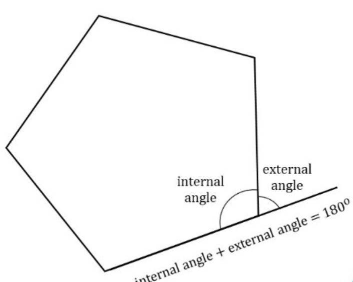
02/22/18

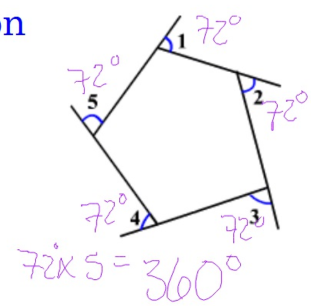
IWBAT discover the sum of the measures of the exterior angles of a polygon.

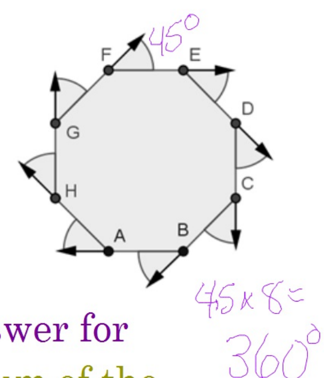
Exterior angles of a polygon

8/31/16

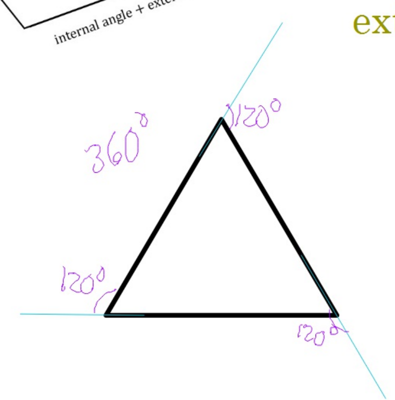








Can we get a single answer for "For any polygon, the sum of the exterior angles is ___360°___."?



IWBAT discover the sum of the measures of the exterior angles of a polygon.

Exterior angles of a polygon

How can we use this to find the interior angle measurements?

1000-gon

$\sum$ exterior $= 360°$

interior $= ?°$

$n =$ number of sides

$e + i = 180°$

$\frac{360}{1000} + i = 180°$

$.36 + i = 180°$
$-.36 \qquad -.36$

$i = 179.64°$

$\frac{360°}{n} + i = 180°$

$i = 180° - \frac{360°}{n}$

Can we write a conjecture for an equiangular (regular) polygon?

You can find the measure of one interior angle of any polygon using $i = 180° - \frac{360°}{n}$ or $\frac{180°(n-2)}{n}$

IWBAT discover the sum of the measures of the exterior angles of a polygon.

Exterior angles of a polygon

Exercises DG p. 262 #1, 4-12 all

IWBAT discover the sum of the measures of the exterior angles of a polygon.

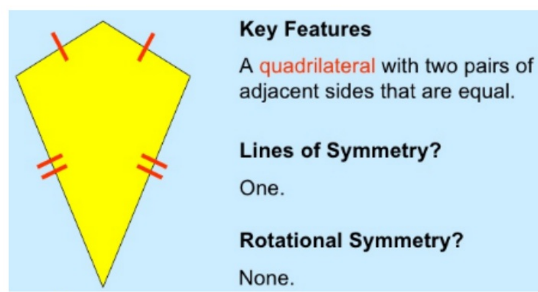
Kites and Trapeziod Properties 02/23/18

IWBAT discover properties of kites and trapezoids.

Kites and Trapeziod Properties

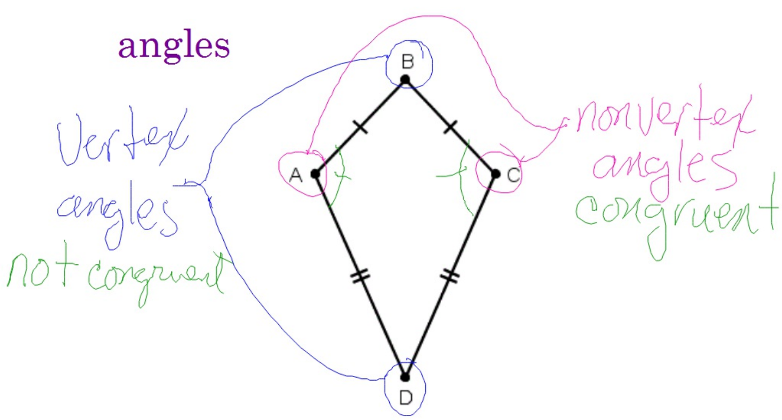
What can we say about kite

- angles,
- diagonals,
- diagonal bisectors,
- angle bisectors?



We need to form a conjecture for each.

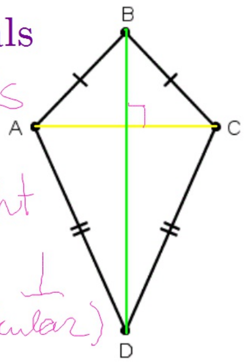
angles



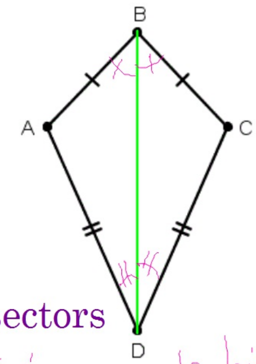
IWBAT discover properties of kites and trapezoids.

Kites and Trapeziod Properties

diagonals



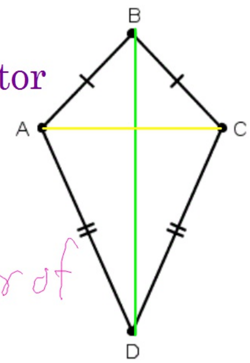
diagonals meet at right angles $\perp$ (perpendicular)



angle bisectors

$\overline{BD}$ is an angle bisector of the vertex angles

diagonal bisector

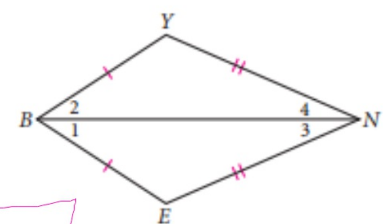


$\overline{BD}$ bisects $\overline{AC}$

$\overline{BD}$ is the $\perp$ bisector of $\overline{AC}$

IWBAT discover properties of kites and trapezoids.

Copy and complete the flowchart to show how the Kite Angle Bisector Conjecture follows logically from one of the triangle congruence conjectures.



Given: Kite *BENY* with $\overline{BE} \cong \overline{BY}$, $\overline{EN} \cong \overline{YN}$

Show: $\overline{BN}$ bisects $\angle B$

$\overline{BN}$ bisects $\angle N$

Flowchart Proof

1. $\overline{BE} \cong \overline{BY}$ — Given
2. $\overline{EN} \cong \overline{YN}$ — Given
3. $\underline{?} \cong \underline{?}$ — Same segment

$\overline{BN} \cong \overline{BN}$

4. $\triangle BEN \cong \underline{?}$ — $\underline{?}$ Congruence shortcut

$\triangle BYN$

SSS

5. $\angle 1 \cong \underline{?}$ and $\angle 3 \cong \underline{?}$ — $\underline{?}$

$\angle 2$, $\angle 4$

CPCTC

6. $\underline{?}$ and $\underline{?}$ — Definition of angle bisector

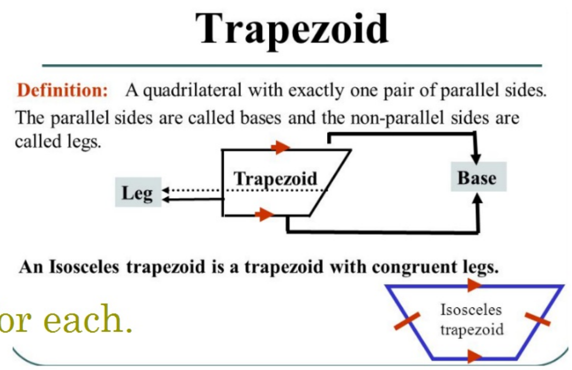
$\overline{BN}$ bisects $\angle B$ + $\overline{BN}$ bisects $\angle N$

Kites and Trapeziod Properties

What can we say about trapezoid

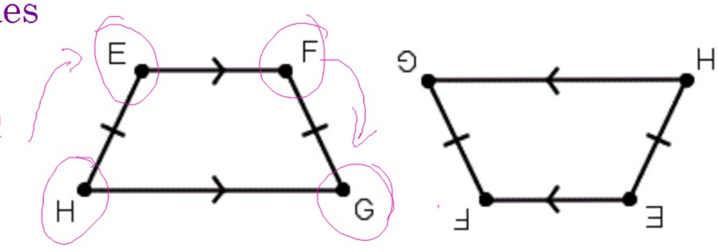
- consecutive angles
- Isosceles trapezoids
- Isosceles trap diagonals?

We need to form a conjecture for each.



consecutive angles

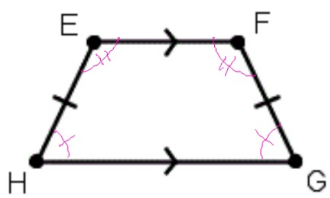
sum to 180°
and are therefore
supplementary

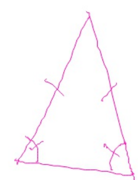


IWBAT discover properties of kites and trapezoids.

Kites and Trapeziod Properties

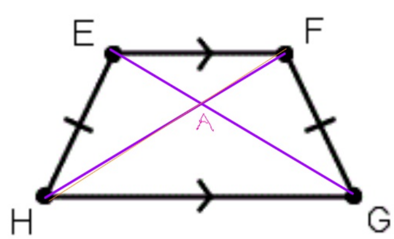
isosceles trapezoid





isosceles trapeziod diagonals

the diagonals
are congruent



$\triangle EAH \cong \triangle FAG$
SSS

$\triangle EGH \cong \triangle FHG$
SSS

IWBAT discover properties of kites and trapezoids.

Kites and Trapeziod Properties

Exercises DG pp. 269-270 #1, 2, 4, 6, 9

IWBAT discover properties of kites and trapezoids.

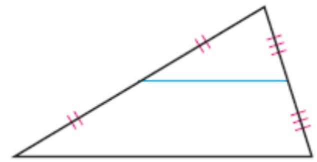
Properties of Midsegments

02/27/18

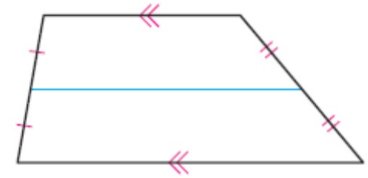
IWBAT define and discover properties of midsegments in triangles and trapezoids.

Properties of Midsegments

The segment connecting the midpoints of two sides of a triangle is the midsegment of a triangle.

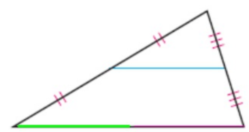


The segment connecting the midpoints of the two nonparallel sides of a trapezoid is also called the midsegment of a trapezoid.



Triangle Midsegment Conjecture

A midsegment of a triangle is parallel to the third side and half the length of the third side.

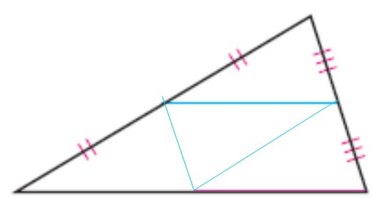


IWBAT define and discover properties of midsegments in triangles and trapezoids.

Properties of Midsegments

Three Midsegment Conjecture

The three midsegments of a triangle divide it into 4 congruent triangles.

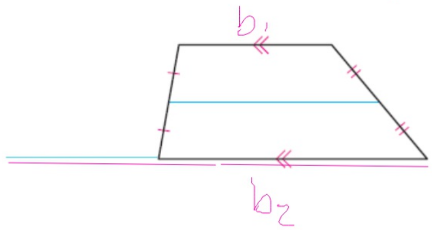


IWBAT define and discover properties of midsegments in triangles and trapezoids.

Properties of Midsegments

Trapezoid Midsegment Conjecture

The midsegment of a trapezoid is parallel to the bases and is equal in length to half of the sum of the lengths of the bases $\left(\frac{b_1+b_2}{2}\right)$.



IWBAT define and discover properties of midsegments in triangles and trapezoids.

Properties of Midsegments

Exercises DG pp. 275-276 #2-4, 6, 7, 8

IWBAT define and discover properties of midsegments in triangles and trapezoids.

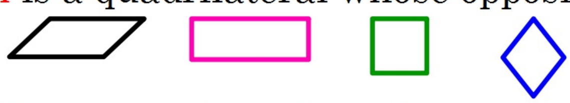
Properties of Parallelograms

02/28/18

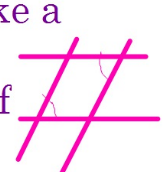
IWBAT discover properties of parallelograms.

Properties of Parallelograms

A parallelogram is a quadrilateral whose opposite sides are parallel.

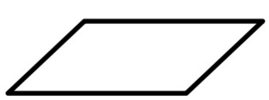


- Using the lines on a piece of graph paper as a guide, draw a pair of parallel lines that are at least 6 cm apart.
- Using the parallel edges of your straightedge, make a parallelogram. Label your parallelogram LOVE.
- Look at the opposite angles. Measure the angles of parallelogram LOVE.
- Compare a pair of opposite angles using your protractor.
- Compare results with your table mates.



Parallelogram Opposite Angles Conjecture

The opposite angles of a parallelogram are Congruent.

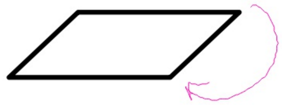


IWBAT discover properties of parallelograms.

Properties of Parallelograms

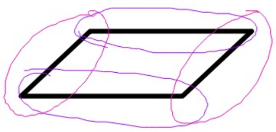
Parallelogram Consecutive Angles Conjecture

The consecutive angles of a parallelogram are Supplementary.



Parallelogram Opposite Sides Conjecture

The opposite sides of a parallelogram are Congruent.

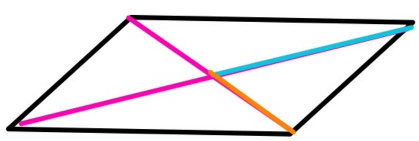


IWBAT discover properties of parallelograms.

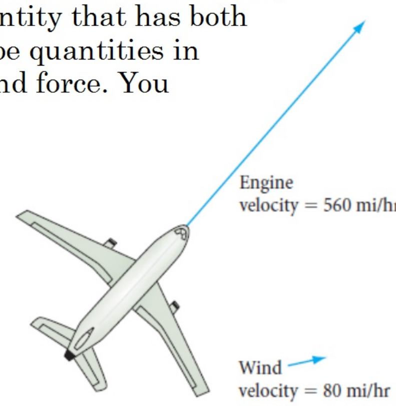
Properties of Parallelograms

Parallelogram Diagonals Conjecture

The diagonals of a parallelogram bisects each other.



Parallelograms are used in vector diagrams, which have many applications in science. A vector is a quantity that has both magnitude and direction. Vectors describe quantities in physics, such as velocity, acceleration, and force. You can represent a vector by drawing an arrow. The length and direction of the arrow represent the magnitude and direction of the vector. For example, a velocity vector tells you an airplane's speed and direction. The lengths of vectors in a diagram are proportional to the quantities they represent.



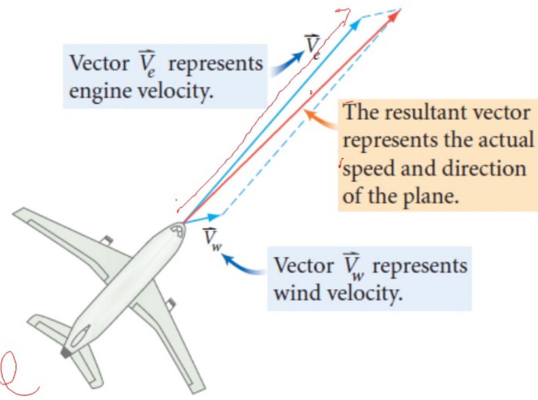
IWBAT discover properties of parallelograms.

Properties of Parallelograms

In many physics problems, you combine vector quantities acting on the same object. For example, the wind current and engine thrust vectors determine the velocity of an airplane. The resultant vector of these vectors is a single vector that has the same effect. It can also be called a vector sum.

To find a resultant vector, make a parallelogram with the vectors as sides. The resultant vector is the diagonal of the parallelogram from the two vectors' tails to the opposite vertex.

In the diagram at right, the resultant vector shows that the wind will speed up the plane, and will also blow it slightly off course.



What would the pilot of this plane have to do to stay on course?

He would have to slightly fly to the left.

IWBAT discover properties of parallelograms.

Properties of Parallelograms

Exercises DG p. 281 #3-6, 11, 13

IWBAT discover properties of parallelograms.

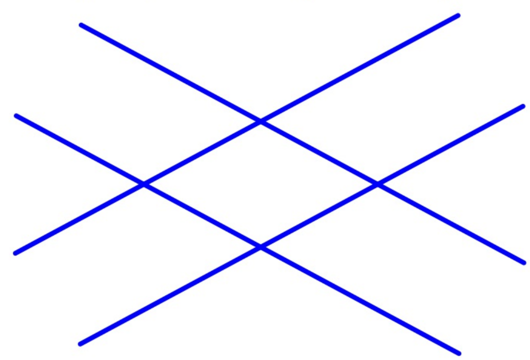
Properties of Special Parallelograms 03/01/18

IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Double-Edged Straightedge Conjecture

If two parallel lines are intersected by a second pair of parallel lines that are the same distance apart as the first pair, then the parallelogram formed is a _________?

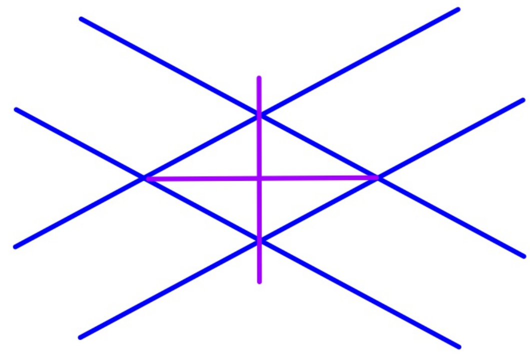


IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Rhombus Diagonals Conjecture

The diagonals of a rhombus are _______, and they _______.

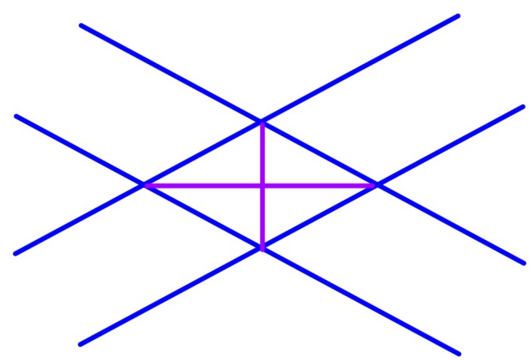


IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Rhombus Angles Conjecture

The _______ of a rhombus _______ the angles of the rhombus.

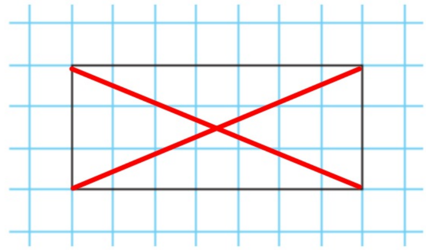


IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Rectangle Diagonals Conjecture

The diagonals of a rectangle are __________ and __________ .

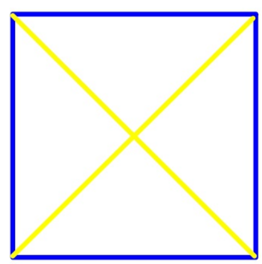


IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Square Diagonals Conjecture

The diagonals of a square are __________, __________, and __________ .



IWBAT discover properties of rhombuses, rectangles, and squares.

Properties of Special Parallelograms

Exercises DG pp. 290-291 #2-18 evens, 20, 21

IWBAT discover properties of rhombuses, rectangles, and squares.

Proving Quadrilateral Properties

03/02/18

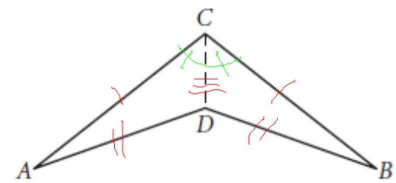
IWBAT practice writing flowchart and paragraph proofs.

Proving Quadrilateral Properties

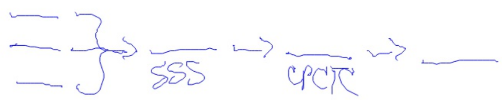
A concave kite is sometimes called a dart.

Given: Dart $ADBC$ with $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$

Show: $\overline{CD}$ bisects $\angle ACB$



$\overline{AC} \cong \overline{BC}$	Given
$\overline{AD} \cong \overline{BD}$	Given
$\overline{CD} \cong \overline{CD}$	Same segment
$\triangle ACD \cong \triangle BCD$	SSS congruence shortcut
$\angle ACD \cong \angle BCD$	CPCTC
$\overline{CD}$ bisects $\angle ACB$	Def. of an $\angle$ bisector



IWBAT practice writing flowchart and paragraph proofs.

Proving Quadrilateral Properties

Paragraph proof

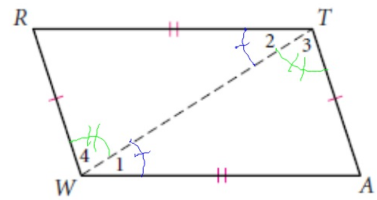
"It is given that $\overline{AC} \cong \overline{BC}$ and $\overline{AD} \cong \overline{BD}$. $\overline{CD} \cong \overline{CD}$ because it is the same segment in both triangles. So, $\triangle ADC \cong \triangle BDC$ by the SSS Congruence Conjecture. So, $\angle ACD \cong \angle BCD$ by the definition of congruent triangles (CPCTC). Therefore, by the definition of angle bisectors, $\overline{CD}$ is the bisector of $\angle ACB$. Q.E.D."

The abbreviation Q.E.D. at the end of a proof stands for the Latin phrase *quod erat demonstrandum*, meaning "which was to be demonstrated."

IWBAT practice writing flowchart and paragraph proofs.

Proving Quadrilateral Properties

Prove the conjecture: If the opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.



Given: Quadrilateral *WATR*, with $\overline{WA} \cong \overline{RT}$ and $\overline{WR} \cong \overline{AT}$, and diagonal $\overline{WT}$

Show: *WATR* is a parallelogram

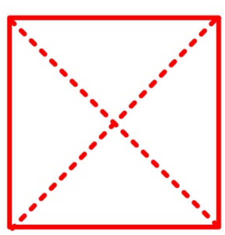
Flowchart Proof

1. $\overline{RT} \cong \overline{WA}$ — Given
2. $\overline{WR} \cong \overline{AT}$ — Given
3. $\overline{TW} \cong \overline{TW}$ — same segment
4. $\triangle TRW \cong \triangle WAT$ — SSS
5. $\angle 1 \cong \angle 2$ — CPCTC
6. $\overline{TR} \parallel \overline{WA}$ — Converse of the || lines Conjecture
7. $\angle 4 \cong \angle 3$ — CPCTC
8. $\overline{RW} \parallel \overline{AT}$ — Converse of the || lines Conjecture
9. *WATR* is a parallelogram — Def. of a parallelogram

IWBAT practice writing flowchart and paragraph proofs.

Proving Quadrilateral Properties

Exercises p. 297 #7 & 9



IWBAT practice writing flowchart and paragraph proofs.

Unit test review 03/01/18

pp. 300-303 #14, 15, 21-24, 25, 27

What should be in your notebook as of today:

Exercises pp. 200-201 DG #1-22 Evens

Exercises DG pp. 257-8 #1, 2, 5, 6, 8-11

Exercises DG p. 262 #1, 4-12 all

Exercises DG pp. 269-270 #1, 2, 4, 6, 9

Exercises DG pp. 275-276 #2-4, 6, 7, 8

Exercises DG p. 281 #3-6, 11, 13

Exercises DG pp. 290-291 #2-18 evens, 20, 21